



Radiology Techniques Department
Special Radiological Procedures-1

lecture 3

*Methods of Imaging the Gastrointestinal
Tract and contrast swallow*

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Methods of Imaging the Gastrointestinal Tract

1. Plain film
2. Barium swallow
3. Barium meal
4. Barium follow-through
5. Barium enema
6. Ultrasound (US):
 - (a) Transabdominal
 - (b) Endosonography
7. Computed tomography (CT)
8. Magnetic resonance imaging (MRI)
9. Angiography
10. Radionuclide imaging:
 - (a) Inflammatory bowel disease
 - (b) Gastro-oesophageal reflux
 - (c) Gastric emptying
 - (d) Bile reflux study
 - (e) Meckel's scan
 - (f) Gastrointestinal bleeding.

Barium

Advantages

*The main **advantage** of barium over water-soluble contrast agents is

1. **better mucosal detail.**

2. **Low cost.**

Disadvantages

1. Prevents accurate subsequent **abdominal CT** interpretation with potential delays of up to **2 weeks** to allow satisfactory **clearance of the barium** (requiring 2 weeks to clearance of barium from abdominal CT).

2. **High morbidity** when barium **entering the peritoneal cavity.**

Contraindication

1. **Perforation**: A tear or hole in esophagus or intestines.
2. **Obstruction**: Blockage in intestines or severe constipation.
3. **Aspiration**: Severe problems with swallowing. This makes it more likely that **barium** would accidentally **go into the lungs.**

Q/ The patient may need double contrast by co2 with examination of some organs such as

- For oesophagus, stomach and duodenum the (**CO2**) used in conjunction **with barium** to achieve a '**double contrast**' effect, for the upper gastrointestinal tract, CO2 is administered **orally.**

- While for large bowel **double contrast** can be achieved by **CO2 insufflating pumps** to produce optimal distension or by **hand pump**

*manual insufflation is more likely to cause discomfort and be associated with perforation.

Contrast swallow

Barium swallow is a radiological examination of the esophagus, pharynx, and proximal stomach.

Method

single or double contrast

Indications:

1. Failed upper gastrointestinal GI endoscopy
2. Gastro-oesophageal reflux
3. Dysphagia or odynophagia
4. Motility disorders such as **achalasia**
5. Tracheo-oesophageal fistulae

*barium swallow also used to assessment esophageal diverticulum, hiatus hernia, varices, and stricture.

Contraindications

None.

Contrast Medium

1. **barium** better mucosal detail and low cost
2. **LOCM** if perforation is suspected. (Barium should NOT be used initially if perforation is suspected).
3. **LOCM** if aspiration is suspected (Barium and Gastrografin should NOT be used for the investigation of a tracheo-oesophageal fistula or when aspiration is a possibility. Use LOCM instead)

Equipment

1. **Fluoroscopy unit with spot image device**, rapid exposures (6 frames s⁻¹)
2. **Video recording** may be required for assessment of the laryngopharynx and upper oesophagus during deglutition.

Patient Preparation

None (but as for barium meal if the stomach is also to be examined).

Technique

1. **erect right anterior oblique (RAO) position** to project the oesophagus clear of the spine.

*Then further mouthfuls with spot exposure(s) to include the whole oesophagus with dedicated **anterior posterior (AP) views** of the **gastro-oesophageal junction**.

2. **AP and lateral** Dynamic views of the **hypopharynx** and **esophagus** during patient swallowing.

3. The patient is placed semiprone in a ‘**recovery position**’ in a **left posterior oblique (LPO) position**. To identify **hiatus hernia** and **varices**.

4. **Modifications** may be required depending on the clinical indication.

(a) If **dysmotility** is suspected, **barium should be mixed with bread bolus** and observed under fluoroscopy correlating symptoms with the passage of the bolus in the **erect position**.

(b) **If perforation** is suspected, a **CT with oral contrast** is more sensitive and provides improved anatomical location of perforation.

(c) The patient is **positioned prone with the arms up** and the table may be tilted slightly **head down** to demonstrate a **tracheo-oesophageal fistula in infants**.

Aftercare

Q/ The most common **aftercare** of oral contrast media such as (barium swallow, barium meal, and barium follow through)

1. Eat and drink as normal but with extra fluids
2. Patient warned about white stool
3. Patient not leave before blurring by buscopan is revealed

Complications

Q/ The most common **Complications** of oral contrast media such as (barium swallow, barium meal, and barium follow through)

1. Leakage of barium from an unsuspected perforation
2. Aspiration
3. Conversion of a partial large bowel obstruction into a complete obstruction by the impaction of barium
4. Barium appendicitis (very rare)
5. Side effects of the pharmacological agents if used